



# Model DMM7510 7½ Digit Graphical Multimeter

## Version 1.6.1a Firmware Release Notes

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## General Information

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### Supported models

This firmware is intended for use on the following Keithley Instruments product models:

DMM7510, DMM7510-NFP, DMM7510-RACK, DMM7510-NFP-RACK

### Firmware Upgrade Instructions

*NOTE: Do not turn off power or remove the USB flash drive until the upgrade process is complete.*

**From the front panel:**

1. Copy the firmware upgrade file to a USB flash drive. The file is: `ki_DMM7510_v1_6_1a0i.upg`.
2. Verify that the upgrade file is in the root subdirectory of the flash drive and that it is the **ONLY** firmware upgrade file in that location. Model DMM7510 firmware files end with the file extension `.upg`.  
(example: `H:\ki_DMM7510_v1_6_1a.upg`)
3. Disconnect any input and output terminals that are attached to the instrument.
4. Turn on instrument power.
5. Insert the flash drive into the USB port on the front panel of the instrument.
6. From the instrument front panel, press the **MENU** key.
7. Under System, select **Info/Manage**.
8. Select the type of upgrade you want to do:  
To upgrade to a newer version of firmware: Select **Upgrade to New**.  
To force downgrading to an older version of firmware: Select **Downgrade to Older**.
9. If the instrument is controlled remotely, a message is displayed. Select **Yes** to continue.
10. When the upgrade is complete, reboot the instrument.

*NOTE: A message is displayed while the upgrade is in progress. Do not remove power until the upgrade message shows complete (it should take less than 7 minutes).*

For additional information about upgrading the firmware, refer to the “How do I upgrade firmware?” topic in the “Frequently Asked Questions (FAQs)” section of the *Model DMM7510 7 ½ Digit Graphical Sampling Multimeter Reference Manual* (document number: DMM7510-901-01). This manual is available online at <http://www.tek.com/support>. Search for “DMM7510 Reference Manual”.

### Upgrade considerations for the Model DMM7510

Upgrade files are available on the Keithley Instruments website (<http://www.tek.com/keithley>).

To find firmware files on the Keithley Instruments website:

1. Select the **Support** tab.
2. In the model number box, type **DMM7510**.
3. Select **Firmware**.
4. Click the search button. A list of available firmware updates and any available documentation for the instrument is displayed.
5. Click the file you want to download.

## Version v1.6.1a Release

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### Overview

Version 1.6.1a is a Hot Fix against Service Pack 6 firmware v1.6.0i. Only one critical fix was made and no other changes were introduced.

[RELEASED 25-JUL-2016](#)

### Critical Fixes

PR59438 HF1: Cannot graph digitizer with track group

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

When customers enable track groups on the graph, data is either wrong or completely missing. This is especially problematic for graphing digitized data and for Demo mode.

**Resolution:**

This issue has been corrected.

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## Version v1.6.0i Release

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### Overview

Version 1.6.0i is the fifth official firmware release for the Model DMM7510 firmware. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

[RELEASED 18-JUL-2016](#)

### Compatibility concerns

n/a

### Critical Fixes

PR57048 Instrument not reliably responding to NI VISA “go to local” function

PR57905

AR50675

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

Under certain conditions customers are not able to reconnect to the 7510 after remote operation and manually placing the 7510 into local mode.

**Resolution:**

This issue has been corrected. The instrument will now go into “local mode” after issuing the “logout” command.

PR58209 UI incorrectly shows a 2<sup>nd</sup> trigger line and causes a 5701 A/D Timeout error.

AR52702

**Models affected:**

All 7510 models

**Symptom:**

Sometime trigger level falsely shows 2 lines when edge trigger is set (only 1 line) on the Graph.

**Resolution:**

This issue has been corrected.

PR58210 Buffer file contains extra NULL values.

AR52304

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

When saving a databuffer on the DMM7510 form the internal webpage the databuffer will insert NULL values into the CSV file. When saving a buffer from the front panel of the instrument there are no NULL values inserted for the same data set.

**Resolution:**

This issue has been corrected. Extra NULL characters are no longer generated.

PR58329 There are complaints about swipe screen performance.  
AR52702

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

Most swipe screens appear to move more slowly than in previous firmware revisions.

**Resolution:**

This issue has been corrected. Swipe screen action has been restored to previous versions of firmware and has been slightly sped up.

PR58330 Graph Stats stops updating.  
AR52703

**Models affected:**

All 7510 models

**Symptom:**

After swiping back and forth between swipe screens, the graph stats window will occasionally stop updating.

**Resolution:**

This issue has been corrected.

PR58384 Downgrading from firmware revision v1.5.0 to v1.3.0 will cause the unit to reboot unnecessarily.  
AR52713

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

When downgrading firmware from v1.5.0 to v1.3.0, a warning message window instructing the user to remove existing scripts will display and then the unit will reboot unconditionally.

**Resolution:**

This issue has been corrected with version v1.6.0 and later. The unit will only reboot if the user proceeds with the downgrade.

PR58469 Pressing the <HOME> button 2 times behavior changes from v1.3.0 to v1.5.0.  
AR52717

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

Feature definition on FW 1.3.0s or earlier is push HOME key once goes to last swipe screen on the home screen. Pushing HOME key a 2<sup>nd</sup> time takes you back to home swipe on the home screen. FW1.5.0g does not do that 2nd HOME key action.

**Resolution:**

This issue has been corrected. Previous behavior has been restored.

PR56812 TTI Instruments do not work well when TSP-Linked to a Model 26xx.

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

When hooking up (4) 26xx-X SMUs to each other in series (one of which is the master) and then putting a TTI Instrument on the end, the box will lock up after the 3rd tsplink.reset(). The problem gets worse if you start hooking instruments in parallel.

**Resolution:**

This issue has been corrected.

PR58964 Timing problem with Autoexec scripts.

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

Certain scripts that have been designated as 'default' or Autoexec scripts will start running before the system has completely booted up. This may cause the Autoexec script to get skipped and not executed at all upon first boot up.

**Resolution:**

This issue has been corrected.

PR59141 Pressing navigation knob when the instrument is booting causes a blue screen.

**Models affected:**

All 7510 models

**Symptom:**

Pressing the navigation knob many times during boot up may cause a blue screen.

**Resolution:**

This issue has been corrected.

## Enhancements

**PR56495 Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Enhancement:**

When turning on REL, the units on the graph should not change. This behavior has been implemented.

**PR58734 Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Enhancement:**

The reading tables have been enhanced to visually differentiate between OVERFLOW and LIMITS. Overflow readings will now be set to **RED TEXT** and Limits will be set to **YELLOW**

## Noncritical Fixes

**PR58864** Swipe screen content disappears after pressing the home key on large reading screen.

**Models affected:**

All 2450 models, 2460 models, 2461 models, 7510 models

**Symptom:**

Under certain sequences of events, after minimizing the default swipe screen and then pressing the HOME button, certain content on the swipe screen will be missing.

**Resolution:**

This issue has been corrected.

## Known issues

**PR54610** TSP-Linked networks cannot support transferring data to the master in real time at high speeds

**Models affected:**

All DMM7510 Models

**Symptom:**

Setup a TSP network and configure a slave instrument to digitize measurements at high speeds (for example, 1 million readings/second). Attempting to transfer data across the TSP bus in real time at high speeds will cause bus errors. This may manifest as either of the following errors being reported.

"Error 1211: Node N is inaccessible"

"-1073807305, Device reported an input protocol error during transfer."

**Workaround:**

Transfer data after the measurement acquisition completes.

To avoid accidentally configuring a real time transfer, specify the node prefix when entering the buffer to store measurements. A slave should store high speed digitizer data in `node[N].defbuffer1` instead of `defbuffer1` when executing scripts on the master. If the `node[N]` prefix is missing, it will attempt to store data in the master node's buffer, which will require measurements to be transferred at acquisition speeds and will overrun the bus.

PR54696 Web page virtual front panel stops updating after long periods left viewing a live graph

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure your instrument to make measurements continuously and navigate to the graph screen. Meanwhile, launch the instrument webpage and view the virtual front panel. If you leave the virtual front panel connected for longer than an hour, the web page image may freeze. Once it freezes, the virtual front panel will no longer display the screen image until the instrument is rebooted. The instrument UI will continue to work correctly, as will all other instrument functionality. Only the virtual front panel is affected.

**Workaround:**

Once the problem is encountered, the only workaround is to reboot the instrument. Try to avoid leaving the virtual front panel connected for long periods on the graph screen while it is continuously being updated with high speed measurements.

PR55735 UI responsiveness may suffer when graphing multiple traces at once with x-scaling set to "All"

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Store data into 2 different buffers. Navigate to the graph and enable both buffers so both can be viewed on the graph. Set the x-axis scaling to "All". Continue to acquire data in one of the buffers and allow it to wrap. The graph will update the scale each time new measurements come in. The excessively frequent updates will slow down responsiveness of the UI.

**Workaround:**

Select another scaling method other than "All".  
You can also avoid this problem if you graph the signals separately.

PR55743 May observe slight delays between measurements when navigating the UI while in CONT mode

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Put the UI in continuous trigger mode. Set the measure count to 1 on any DMM function with the NPLC set to 0.1 or lower so that readings are triggered quickly. The user interface will trigger readings



as quickly as possible once the previous reading completes. When navigating the UI, there may be a slight delay before triggering the next measurement. This occurs most often when navigating to a view that includes the graph. The graph requires processing of potentially large amounts of data and can cause a small delay initiating the next measurement.

This delay is most apparent if you view the graph and zoom in very closely on the data. The timestamps also will show a discontinuity (on the order of tens of milliseconds typically).

**Workaround:**

One workaround is to use a large measure count. All readings in the burst performed for the measure count will not be affected by any delays caused by UI interactions.

Another workaround is to use the trigger model. The trigger model executes more closely to hardware for optimal performance.

Setting the x-axis scaling to "All" also worsens the issue. Using another scaling method reduces the impact.

## Version v1.5.0g Release

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### Overview

Version 1.5.0g is the fourth official firmware release for the Model DMM7510 firmware. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

[RELEASED 11-MAR-2016](#)

### Compatibility concerns

Firmware revision v1.5.0g can be installed on any vintage DMM7510. After upgrading to v1.5.0g, be advised that in order to downgrade back to previous versions of firmware, you **MUST** archive and remove all saved scripts before the downgrade will be allowed.

### Critical Fixes

PR56630 Problem with Trigger Model not waiting.

AR50775

**Models affected:**

All DMM7510 models

**Symptom:**

Under certain conditions when an SMU is connected to a digitizing instrument (2461 or DMM7510) the digitizer will start digitizing before the trigger has been sent to start it.

**Resolution:**

This issue has been corrected.

PR56963 Virtual front panel scrolling issue.

**Models affected:**

All DMM7510 models

**Symptom:**

When using the virtual front panel, the user is unable to scroll up and down in the system settings menu. Using the web interface, the user should be allowed to at least scroll through the system settings.

**Resolution:**

This issue has been corrected.

PR57015 Memory corruption when using a Config List over 60,000 indexes.

**Models affected:**

All DMM7510 models

**Symptom:**

When creating a Config List of greater than 60,000 indexes, when trying to retrieve values above index 60,000, the wrong index was retrieved and the number of indexes over-flowed.

**Resolution:**

This issue has been corrected. The maximum number of indexes is correctly supported up to 300,000.

PR57515 Cursor statistics don't display if  $x1 > x2$ .

**Models affected:**

All DMM7510 models

**Symptom:**

Notice that the stats are displayed as long as  $x2$  is to the right of  $x1$ . As soon as they cross, hash marks are displayed for all stats.

**Resolution:**

This issue has been corrected.

## Enhancements

No PR **Models affected:**

All DMM7510 models

**Enhancement:**

The behavior of the command `display.waitevent()` has changed. When the example below is run, a dialog will be shown. If Yes or No is not pressed within 1 second, then `display.waitevent()` will time out. The `buttonId` will now contain `display.BUTTON_SELF` instead of 0 (zero). It will also return `display.BUTTON_SELF` if the prompt is removed with `display.delete()`.

```
display.prompt(display.BUTTONS_YESNO, "Press Yes or No...")
objectID, buttonId = display.waitevent(1)
```

PR57906 **Models affected:**

AR50675 All DMM7510 models

**Enhancement:**

Add a command to put the instrument into LOCAL mode.

The command `logout` can be used to log out of remote mode and force the instrument into LOCAL mode. This command was previously failing in certain situations. This command is now fully supported.

## Noncritical Fixes

N/A

## Known issues

N/A

## Version v1.3.0s Release

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### Overview

Version 1.3.0s is the third official firmware release for the Model DMM7510 firmware. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

[RELEASED 10-JUN-2015](#)

### Compatibility concerns

N/A

### Critical Fixes

PR55600 \*TRG command trigger source does not work in SCPI mode trigger model.

**Models affected:**

All 7510 models

**Symptom:**

Using a trigger model .wait block with the command event in SCPI does not work when \*TRG is sent. Instead, it generates the following error ==> Error 2713 - "No trigger model engine available".

**Resolution:**

This issue has been resolved. Now, the \*TRG command will satisfy the wait block when sent if waiting for a command event.

PR55782 :READ? Query always returns the last reading at the end of the continuous buffer.  
AR42592

**Models affected:**

All 7510 models (all variations)

**Symptom:**

For example, if a basic measurement is set up to defbuffer1 (size 10000) and then takes 11000 readings, the last 1000 readings will all return the same value. This should act as a circular buffer.

**Resolution:**

This issue has been corrected. This PR was previously on the "Known Issues" list.

PR56184 Bluescreen sometimes when switching X-Axis on an empty buffer

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Intermittently, when adding defbuffer2 to the graph, then removing defbuffer1, then toggling between time and custom, the unit will lock up.

**Resolution:**

This issue has been corrected.

## Enhancements

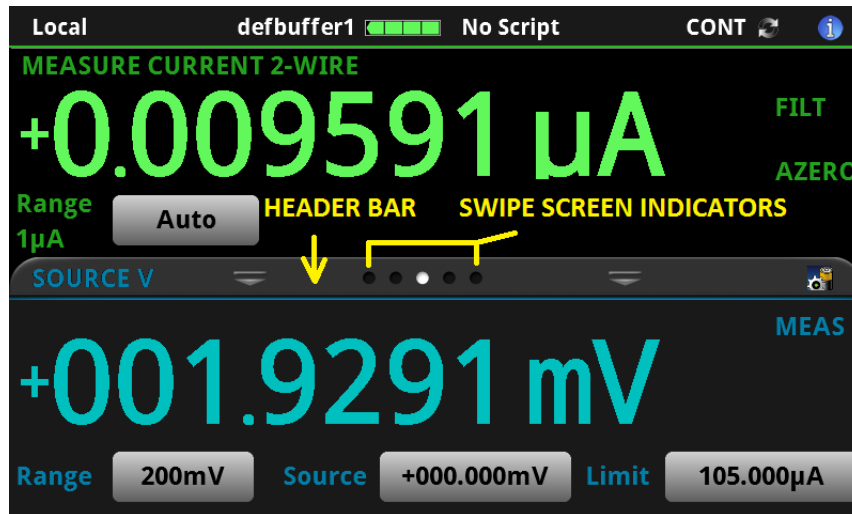
### GENERAL Models affected:

All 7510 models

### Enhancement:


A number of improvements have been made to the overall Graphical User Interface as follows:

1. Screen Colors: All screen colors have been modified for better contrast and easier readability.
2. Pinch-to-Zoom Performance: Throughout the user interface, the “Pinch-to-zoom” touch screen motion has been improved and is more responsive.
3. Improve Swiping:
  - a. The swipe user interface gesturing has been dramatically improved and is more responsive.
  - b. Added Vertical Swiping in various screens in the GUI.
  - c. Horizontal swiping has been made more smooth and is consistent with Vertical Swiping.
  - d. “Fling” swiping has been implemented where faster swiping actions result in rapid scrolling followed by decay based on the velocity of the “fling.”
  - e. Swipe Down on the Home screen will display larger readings.
4. Tabs and Buttons: Throughout the user interface multiple data display options have been made available through tabs (header bars) with swipe screen indicators to show how many options are available and which display tab is active.



5. Graphing:
  - a. New Auto Scale Options (X-Axis) → Track Latest, Track Group
  - b. New Auto Scale Options (Y-Axis) → y-swim lanes, y-shared, y-per trace
  - c. Multi-Trace Line Plots
  - d. Multi-Trace Scatter Plots
  - e. Various refresh and performance improvements

6. Histogram:
  - a. New Auto-Scale, Auto-Bin, and Fit
  - b. Smartscale choose best scaling option
  - c. Various refresh and performance improvements
7. TTI Synchronization: All Touch, Test, Invent® Keithley Models including the 2450, 2460, and 7510 have been carefully updated so that they are all consistent in look, feel, and general navigation.
8. Updated Reading Table: Added new reading table features and a new Reading Preview Graph. Please see the Reference Manual for further details.

READING TABLE			
Buffer	Active (defbuffer1)		
Buffer Index	Time	Reading	Source
78824	06/10 07:16:22.174568	+0.009484 $\mu$ A	+001.9090 mV
78825	06/10 07:16:22.845109	+0.009590 $\mu$ A	+001.9310 mV
78826	06/10 07:16:23.515734	+0.009564 $\mu$ A	+001.9228 mV
78827	06/10 07:16:24.186322	+0.009647 $\mu$ A	+001.9427 mV
78828	06/10 07:16:24.856892	+0.009639 $\mu$ A	+001.9420 mV
78829	06/10 07:16:25.527470	+0.009541 $\mu$ A	+001.9195 mV
78830	06/10 07:16:26.198087	+0.009517 $\mu$ A	+001.9151 mV
78831	06/10 07:16:26.868617	+0.009631 $\mu$ A	+001.9391 mV
78832	06/10 07:16:27.539214	+0.009617 $\mu$ A	+001.9381 mV
78833	06/10 07:16:28.209799	+0.009630 $\mu$ A	+001.9398 mV



## Noncritical Fixes

PR55658 Incorrect DCV Home Screen with Quick Set 10M-Ohm annunciator.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

When on the QuickSet window and adjusting the “Performance Slider” all the way to the left (towards Resolution), the home screen 10M-Ohm option remains enabled while the menu page correctly states AUTO.

**Resolution:**

This issue has been corrected.

PR55702 TSP-Link does not support programming an infinite count value

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Use TSP-Link to create a trigger model on a remote node. If you try to set a digitize or measure block to make infinite measurements using the `trigger.COUNT_INFINITE` option, it will generate a TSP link error.

**Resolution:**

This issue has been corrected. This PR was previously on the “Known Issues” list.

PR55725 Histogram axis labels show more resolution than necessary.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

The axis at the bottom of the histogram may show more significant digits than are appropriate.

**Resolution:**

This issue has been corrected. This PR was previously on the “Known Issues” list.

PR55746 Reading table mini graph is sometimes incomplete.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

When navigating to the Reading Table screen, the miniature graph in the upper right corner may not show all readings correctly. It will render a horizontal line which indicates no measurements during that interval, even though there may be measurements. These measurements are still accessible. The miniature graph fails to show them.

This only affects the Reading Table screen. The full screen graph and the Home graph swipe screen are not affected.

**Resolution:**

This issue has been corrected. This PR was previously on the “Known Issues” list.

PR55775 Save to USB Flash Drive window goes away too quickly when saving large buffers

**Models affected:**

DMM7510 (all variations)

**Symptom:**

When saving large files to a USB Flash Drive, the progress window will sometimes disappear before the files are actually saved to the flash drive.

**Resolution:**

This issue has been corrected. The progress window will not be dismissed until all writing to the USB Flash Drive has been completed.

PR55784 Reading table does not work correctly with compact buffers.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Create a buffer and set the Style to Compact. If you try to view the data in the buffer using the Reading Table (Menu > Reading Table), the table will be empty and display “loading”.

**Resolution:**

This issue has been corrected. This PR was previously on the “Known Issues” list.

## Known issues

N/A

## Version 1.1.0f Release

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### Overview

Version 1.1.0f is an update to the Model DMM7510 firmware. Known Issues, Usage Notes, and Upcoming Enhancements are listed below in this document.

[RELEASED 16-MAR-2015](#)

### Compatibility concerns

PR54340 LoopUntilEvent and the Graph screen's "Trigger" tab no longer remember triggers by default

#### Models affected:

DMM7510 (all variations)

#### Concern:

The LoopUntilEvent trigger model template defaults to always clear observed events when entering the wait block. This is opposite behavior in 1.0.0h firmware. In 1.0.0h, events were never cleared.

The Graph's "Trigger" tab uses the LoopUntilEvent template. Therefore, this applies equally to the UI if configured from this screen.

#### Recommendation:

If the original behavior is needed, specify Never on the Graph's Trigger tab or when configuring the LoopUntilEvent template. The bus commands are listed below:

#### SCPI

```
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>, <delay>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>, <delay>,
"<readingBuffer>"
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>, <delay>,
"<readingBuffer>", <readingBlock>
```

where <clearBehavior> is ENTER or NEVER. ENTER is the default.

#### TSP

```
trigger.model.load("LoopUntilEvent", triggerEvent, position)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior, delay)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior, delay, bufferName)
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior, delay, bufferName,
readingBlock)
```

where *clearBehavior* is trigger.CLEAR\_NEVER or trigger.CLEAR\_ENTER. trigger.CLEAR\_ENTER is the default.

## Critical Fixes

PR55094

Compact buffers do not support negative measurements.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

If you create a buffer with a "Compact" style, the negative sign will not be reported. All negative measurements will appear to be positive (the absolute value of the measurement). This does not affect default buffers (defbuffer1 and defbuffer2) since they are fixed at "Standard" style.

**Resolution:**

This issue has been corrected.

PR54918 Loading a config list from the trigger model turns off autoranging

**Models affected:**

DMM7510 (all variations)

**Symptom:**

If you create a trigger model that uses a "Config List" block to recall or load a previous or next set of settings, autoranging is turned off. By default, this leaves the instrument on the 1000V range. This occurs even if the configuration list index attempts to turn autoranging on.

**Resolution:**

This issue has been corrected.

PR54333 SCPI problems with MIN/MAX for the Threshold Level unique to Frequency or Period functions

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Use the [SENSE[1]]:<function>:THRESHOLD:LEVEL command where <function> is FREQUENCY or PERIOD to attempt to set the level to MINIMUM or MAXIMUM. It will incorrectly attempt to set it to 700V, independent of range. On lower ranges, this generates an error.

**Resolution:**

This issue has been corrected.

PR54737, A saved setup (SCPI) or configuration script (TSP) may generate errors when recalling or running it.  
PR54700**Models affected:**

DMM7510 (all variations)

**Symptom:**

A saved setup or configuration script saves and restores the state of the instrument. When the instrument saves the settings into a configuration script, it generates incorrect TSP syntax for some settings in the script. As a result, errors are generated when the script is run to recall the setup. This aborts the execution of the configuration script and halts the process to restore settings. For detailed information on the errors, refer to the Event Log. Warnings do not halt script execution.

This problem only applies to a subset of the TSP command sequence. Most configurations are not affected.

**Resolution:**

This issue has been corrected. If scripts had been modified to deal with this issue in the past, the script will continue to work fine.

PR54656 Cannot set the aperture to 0 for the digitizer using SCPI

**Models affected:**

DMM7510 (all variations)

**Symptom:**

You cannot set the aperture to 0 using the SCPI language as documented in the manual. Either of these commands will generate an error:

```
:SENSE:DIG:CURR:APER 0
```

```
:SENSE:DIG:VOLT:APER 0
```

**Resolution:**

This issue has been corrected. It is still recommended to use AUTO instead of the number.

PR54688 Cannot always abort scripts that use the trigger model with Frequency or Period functions

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure the trigger model to take Frequency or Period measurements using a script. Attempt to abort the script while it is running. The instrument may not always halt execution of the script.

**Resolution:**

This issue has been corrected.

PR54377 Trigger model hangs if a config list attempts to switch between Digitize and Measure

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Create a trigger model using a Measure block that also loads an index from a config list with the function set to take digitizer measurements. The conflict between the DMM Measure and Digitize will cause the trigger model to run indefinitely once started. It is not possible to stop it. This also applies if you create a trigger model with a Digitizer block with a config list that sets up a DMM Measure function.

**Resolution:**

This issue has been corrected. An error will be generated if a conflict prevents the trigger model from executing.

PR55118 Trigger model doesn't update to follow active buffer

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Use the Graph's Trigger tab to configure a trigger model. After the trigger model is generated, change the active buffer from the home screen. The trigger model will not get updated and will still put measurements in what was previously the active buffer.

**Resolution:**

This issue has been corrected.

PR54974, UI graph occasionally appears to be missing digitizer data  
PR54934

**Models affected:**

DMM7510 (all variations)

**Symptom:**

When using the UI to view bursts of digitizer data on the graph, you may see areas that appear to have missing data. Even though data is being sampled consistently throughout the viewable range, it appears as though fewer points are available in the circled area.

This may only occur when more than 5,000 points are visible on the graph at once and sample rates exceed 50k.

**Resolution:**

This issue has been corrected. Not every measurement point is sent to the display when zoomed out and acquiring high speed digitizer readings in real time. An effort is made to send enough so that the signal can be rendered closely. Pan or scale the graph by touching it to force a refresh if more detail is needed. All data will appear if any improved precision is possible.

PR54436 UI graph may fail to autoscale under certain circumstances

**Models affected:**

DMM7510 (all variations)

**Symptom:**

When viewing the graph, the graph may not autoscale correctly when the x-axis scale is set to “All”.

**Resolution:**

This issue has been corrected.

PR54415 UI graph does not display the dashed lines for the analog trigger levels set over the bus

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure the analog trigger using remote bus commands. Then view the graph from the front panel. The dotted lines to indicate the analog trigger level will not appear.

**Resolution:**

This issue has been corrected.

The dotted line will only appear if analog level is used with the LoopUntilEvent template. It will not necessarily appear on the graph if connected to other stimulus destinations.

PR54741 UI graph can encounter scaling and panning difficulties when displaying 2 or more traces

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure the graph to show 2 or more traces at once. Autoscale may not always work correctly. Panning and zooming the signals may also be difficult at times.

**Resolution:**

This issue has been corrected.

PR54718 UI Reading Table does not always allow scrolling to access all digitized readings

**Models affected:**

DMM7510 (all variations)

**Symptom:**

The UI Reading Table (Menu > Reading Table) may not allow you to scroll down using the touch screen or the onscreen arrows even though there is additional data. This problem is particularly pronounced after using the “Jump to” option to navigate the table.

**Resolution:**

This issue has been corrected. You can use the graph in the upper right corner of the screen to help navigate large sets of data. Swipe using the table itself for fine adjustment.

On the full screen Graph, it is also possible to zoom into a point on a graph and then touch the point. A pop up will appear and describe the point value. It includes an option to go to the reading table location where that point resides.

PR48636 DMM7510 does not respect a USB Flash drive file that is read only.

**Models affected:**

DMM7510 (all variations), 2450, 2460

**Symptom:**

The DMM7510 will write over read-only files on flash drives. For example, if the DMM7510 attempts to write to file aaa.txt and aaa.txt is marked read-only, the DMM7510 will rewrite file aaa.txt without warning.

**Resolution:**

This issue has been corrected.

PR55204 Secondary measurement problems from the UI.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Depending upon configuration of the instrument, the secondary measurement feature may cause errors or odd behavior. Enable secondary measurements by going to the Home screen and swiping over to the Secondary measurement screen. Select your secondary function and turn it on.

**Resolution:**

This issue has been corrected.

PR55466 Timestamps sometimes have errors with autozero on and may distort graphed data.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Use the DMM DCV or DCI function with autozero on. A graph of a known waveform such as a sine wave may appear slightly misshaped due to gaps in timestamps.

**Resolution:**

This issue has been corrected.

PR55472 Problems requesting status byte over USB.

**Models affected:**



DMM7510 (all variations)

**Symptom:**

Disconnect and reconnect to the instrument many times while attempting to read the status byte. This may result in a connection error at times.

**Resolution:**

This issue has been corrected.

PR55701 TSP-Link connection problems when digitizing data

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Connect two DMM7510 instruments using TSP-Link. Configure both to digitize large amounts of measurements. Sometimes when the master node triggers the measurements, you may receive a connection lost error.

**Resolution:**

This issue has been corrected.

TSP-Link cannot send digitized readings over the bus in real time. It is generally recommended that you complete acquisition of your measurements before attempting to transfer them between TSP-Link nodes.

## Enhancements

PR54340 LoopUntilEvent and the Graph screen's "Trigger" tab remember triggers by default.

### Models affected:

DMM7510 (all variations)

### Symptom:

If you use the "LoopUntilEvent" Trigger Model template or the Graph's Trigger tab (Menu > Graph > Trigger tab), trigger events that occur during execution of other trigger model blocks will be remembered. This will cause the trigger model's "Wait" block to advance and finish making measurements when it is later reached.

No count is maintained for multiple triggers. The instrument latches only one trigger event and clears it when the Wait block advances.

Example: Configure LoopUntilEvent to wait for a digital input line. When the digital input is pulsed, it will advance the trigger model. If a second pulse occurs (even while the instrument trigger model is executing other blocks), the instrument will latch its occurrence. The next time the instrument waits on the event, it will fire immediately.

Previous firmware gave no control over this behavior.

### Resolution:

The Trigger Model Wait block now accepts a new parameter to specify this behavior. If set to Never clear, the trigger model will advance through the wait block even if an event was seen prior to executing the wait block. If set to Enter, it will clear any events previously observed when entering the Wait block. This forces the wait block to wait on a new event to occur.

Example: Assume a trigger model is configured to wait, make a measurement, and then branch so this occurs 2 times. The trigger model will first wait on the event (such as a digital I/O event). Once that event occurs, it will take a measurement. Assume the event occurs again while taking the measurement but before reaching the Wait block again. If the Wait block is configured to Never clear, it will remember the occurrence of this event and immediately flow through the Wait block. If it is set to Clear On Enter, it will erase memory of this event and wait for a fresh occurrence of the event.

### SCPI

```
:TRIGger:BLOCK:WAIT <blockNumber>, <event>, <clearBehavior>
:TRIGger:BLOCK:WAIT <blockNumber>, <event>, <clearBehavior>, <logic>, <event>
:TRIGger:BLOCK:WAIT <blockNumber>, <event>, <clearBehavior>, <logic>, <event>,
<event>
```

where <clearBehavior> is ENTER or NEVER. NEVER is the default.

```
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>, <delay>
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>,
<delay>, "<readingBuffer>"
:TRIGger:LOAD "LoopUntilEvent", <eventNumber>, <position>, <clearBehavior>,
<delay>, "<readingBuffer>", <readingBlock>
```

where `<clearBehavior>` is `ENTER` or `NEVER`. `ENTER` is the default.

### TSP

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event)
```

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event, clearBehavior)
```

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event, clearBehavior,
logic, event)
```

```
trigger.model.setblock(blockNumber, trigger.BLOCK_WAIT, event, clearBehavior,
logic, event, event)
```

where `clearBehavior` is `trigger.CLEAR_NEVER` or `trigger.CLEAR_ENTER`. `trigger.CLEAR_NEVER` is the default.

```
trigger.model.load("LoopUntilEvent", triggerEvent, position)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay, bufferName)
```

```
trigger.model.load("LoopUntilEvent", triggerEvent, position, clearBehavior,
delay, bufferName, readingBlock)
```

where `clearBehavior` is `trigger.CLEAR_NEVER` or `trigger.CLEAR_ENTER`. `trigger.CLEAR_ENTER` is the default.

PR54718 Support navigation from the Graph to the corresponding point in the Reading Table.

#### **Models affected:**

DMM7510 (all variations)

#### **Symptom:**

Navigating the reading table to find a specific measurement point may be difficult if there are millions of measurements in the buffer. The new Reading Table screen improves this, but still may be difficult at times.

#### **Resolution:**

Navigate to the full screen Graph and view your data. Use the Pinch/Zoom gesture to zoom in on the data point of interest. When only a few points are on the screen, touch the point. A dialog box will appear and show the reading value. Select the "Go to Reading" button. This will take you to the Reading Table and automatically put focus on that exact measurement.

PR55598 Better scaling options added to Histogram graph.

#### **Models affected:**

DMM7510 (all variations)

**Symptom:**

The histogram required you to specify the span of the bins manually. It did not have an option to automatically pick them for you.

**Resolution:**

Histogram now supports 3 different scaling options:

- **Auto Bin** – Automatically sets the min and max boundaries to fit the data available in the selected buffer.
- **Fit** – Adjusts the pan and zoom to fit the entire histogram on the screen. This does not affect the min or max boundaries.
- **SmartScale** – Automatically selects to Auto Bin or Fit based on analyzing data in the chosen buffer.

PR54205 UI supports manually setting REL value.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Previously, it was not possible to program a specific REL value from the user interface. You could only enable REL based upon the current measurement.

**Resolution:**

Select Menu > Calculations and then modify the Rel Value.

PR55581 Improved Performance Slider settings.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

The Performance Slider did not make use of all settings related to speed and accuracy tradeoffs.

**Resolution:**

Access the Performance Slider by pressing the QuickSet key. The settings loaded when dragging the slider to trade off performance have been improved. To see the applied settings, navigate to the Event Log (Menu > Event Log) after using it. All settings are logged.

Performance Slider settings may change between firmware releases. If you want to mimic behavior, note the individual settings and apply them.

PR55628 Track Group now supports panning and zooming within the group.

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Previously, panning or zooming while Track Group was enabled would exit the Track Group scaling mode. Scaling reverted to manual mode and would lock to a point. If the data in that group was overwritten as the buffer wrapped, the data would disappear from the graph. It was not possible to adjust scale and still view the latest group of data.

**Resolution:**

Track Group now has an offset and scale. When you pan and zoom, you set the offset within that group. That offset is maintained even when you advance to the next group. Similarly the zoom is also preserved.

You can no longer pan outside of the group. If you want to pan to previous groups of data in the buffer, disable Track Group by selecting "Off" as the graph's x-axis scaling method.

PR55646 Frequently used swipe screens were positioned far apart from one another

**Models affected:**

DMM7510 (all variations)

**Symptom:**

The Graph and Statistics swipe are commonly referenced when analyzing data. These two swipe screens were 3 swipes apart. This made navigation between them tedious.

**Resolution:**

The order of the swipe screens was updated. Screens likely to be used together were co-located. The order was also set based upon anticipated frequency of use.

**Noncritical Fixes**

N/A

**Known issues**

N/A

## Version 1.0.0h Release

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### Overview

Version 1.0.0h is the initial production release for the Model DMM7510. Known Issues, Usage Notes, and Enhancements are listed in the following pages of this document.

[RELEASED 8-DEC-2014](#)

### Compatibility concerns

N/A

### Critical Fixes

N/A

### Enhancements

PR55094 Command needed for earliest point in a continuous (circular) buffer

#### Models affected:

DMM7510 (all variations)

#### Symptom:

When working with continuous buffers, indexing the first measurement will not necessarily give you the oldest one when the buffer starts to wrap around. This is due to data being written to a continuous buffer in a circular fashion where it continues to overwrite the oldest data after it fills. Unless you know how many measurements were taken, it can be unclear how to index the oldest measurement.

#### Workaround:

New start and end properties were added to buffers. They return the index to the earliest and latest point in the buffer. These will be documented in a future update to the manual.

	SCPI	TSP
Index of earliest measurement	TRACeACTual:STARt? <optional buffer name as string>	bufferVar.startindex
Index of latest measurement	TRACe:ACTual:END? <optional buffer name as string>	bufferVar.endindex

For the SCPI command, if no buffer name is provided, it will default to “defbuffer1”.

Example: You can print the measurements in a buffer (b) in chronological order as follows. This should not be attempted while the buffer is being filled since it is then chasing a moving target.

```
b = buffer.make(1000)

-- Placeholder: Assume you take many measurements here to fill buffer b

printbuffer(b.startindex, b.capacity, b)
printbuffer(1, b.endindex, b)
```

PR55234 It may be easy to forget to delete autoexec script after a system reset

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Create a config script and make it run at power up (Copy to Power Up). This makes a copy of it as the “autoexec” script which runs each time the instrument powers up. If you later perform a System Reset, this will not delete the “autoexec” script causing the instrument to revert back to custom settings after a power cycle.

Similarly deleting the original script will not delete the “autoexec” script. A copy gets made when you select the option to run a script at power up.

**Workaround:**

Delete the “autoexec” script. Clarity will be added to a future version of the manual.

## Noncritical Fixes

N/A

## Known issues

PR55094 Compact buffers do not support negative measurements

**Models affected:**

DMM7510 (all variations)

**Symptom:**

If you create a buffer with a “Compact” style, the negative sign will not be reported. All negative measurements will appear to be positive (the absolute value of the measurement). This does not affect default buffers (defbuffer1 and defbuffer2) since they are fixed at “Standard” style.

**Workaround:**

When creating a custom buffer, use the “Standard” or “Full” style. Avoid “Compact” buffers until this is resolved.

PR54918 Loading a configuration list from the trigger model turns off autoranging

**Models affected:**

DMM7510 (all variations)

**Symptom:**

If you create a trigger model that uses a “Config List” block to recall or load a previous or next set of settings, autoranging is turned off. By default, this leaves the instrument on the 1000V range. This occurs even if the configuration list index attempts to turn autoranging on.

**Workaround:**

If possible, use a trigger model that does not depend on Configuration Lists.

If possible, apply settings using Configuration Lists outside of the trigger model.

PR54333 SCPI problems with MIN/MAX for the Threshold Level unique to Frequency or Period functions

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Use the [SENSe[1]]:<function>.THReshold:LEVel command where <function> is FREQuency or PERiod to attempt to set the level to MINimum or MAXimum. It will incorrectly attempt to set it to 700V, independent of range. On lower ranges, this generates an error.

**Workaround:**

Specify the actual value instead of using the MINimum or MAXimum parameter.

PR54737, A saved setup (SCPI) or configuration script (TSP) may generate errors when recalling or running it  
PR54700



**Models affected:**

DMM7510 (all variations)

**Symptom:**

A saved setup or configuration script saves and restores the state of the instrument. When the instrument saves the settings into a configuration script, it generates incorrect TSP syntax for some settings in the script. As a result, errors are generated when the script is run to recall the setup. This aborts the execution of the configuration script and halts the process to restore settings. For detailed information on the errors, refer to the Event Log. Warnings do not halt script execution.

This problem only applies to a subset of TSP command sequence with examples shown in the table below. Most configurations are not affected.

**Workaround:**

Transfer the setup or configuration script to a computer. Edit it with a text editor and correct the command that generated the error so that it uses the proper syntax.

Possible Errors:

Invalid Command Sequence:	Correct Command Sequence
dmm.measure.func = dmm.FUNC_CONTINUITY dmm.measure.range = <a number>	dmm.measure.func = dmm.FUNC_CONTINUITY
dmm.measure.func = dmm.FUNC_DIODE dmm.measure.range = <a number>	dmm.measure.func = dmm.FUNC_DIODE
trigger.model.* commands appear before settings for "--set up DMM" (look for comment in script)	Move the trigger.model.* commands to appear after the settings for "--set up ACAL" (look for comment in script)

PR54656 Cannot set the aperture to 0 for the digitizer using SCPI

**Models affected:**

DMM7510 (all variations)

**Symptom:**

You cannot set the aperture to 0 using the SCPI language as documented in the manual. Either of these commands will generate an error:

```
:SENSE:DIG:CURR:APER 0      ERROR!
:SENSE:DIG:VOLT:APER 0      ERROR!
```

**Workaround:**

Use "AUTO" instead of 0 if you wish to select an Automatic aperture.

```
:SENSE:DIG:CURR:APER AUTO    CORRECT!
:SENSE:DIG:VOLT:APER AUTO    CORRECT!
```

PR54688

Cannot always abort scripts that use the trigger model with Frequency or Period functions

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure the trigger model to take Frequency or Period measurements using a script. Attempt to abort the script while it is running. The instrument may not always halt execution of the script.

**Workaround:**

Allow the trigger model in the script to run to completion.

PR54377 Trigger model hangs if a config list attempts to switch between Digitize and Measure

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Create a trigger model using a Measure block that also loads a point from a config list with the function set to take digitizer measurements. The conflict between the DMM Measure and Digitize will cause the trigger model to run indefinitely once started. It is not possible to stop it. This also applies if you create a trigger model with a Digitizer block with a config list that sets up a DMM Measure function.

**Workaround:**

Avoid mismatches between Digitizer and DMM Measure that can be introduced when using config lists with the trigger model. Consider configuring and loading separate trigger models or writing a TSP script to achieve the desired behavior.

PR55118 Trigger model doesn't update to follow active buffer

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Use the Graph's Trigger tab to configure a trigger model. After the trigger model is generated, change the active buffer from the home screen. The trigger model will not get updated and will still put measurements in what was previously the active buffer.

**Workaround:**

There are several ways to avoid this:

- (1) Change the Active Buffer before configuring the trigger.
- (2) After changing the Active Buffer, force regeneration of the trigger model by making a change to any setting on the Graph's Trigger tab.
- (3) Manually reconfigure the trigger model to change the buffer selected in the Measure/Digitize block (Menu > Trigger Flow).

PR54974, UI graph occasionally appears to be missing digitizer data  
 PR54934

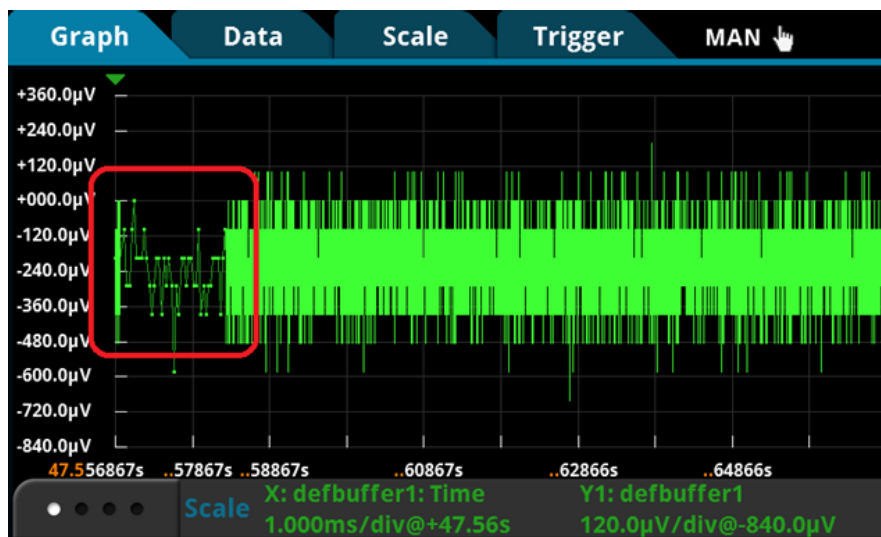
**Models affected:**

DMM7510 (all variations)

**Symptom:**

When using the UI to view bursts of digitizer data on the graph, you may see areas that appear to have missing data. See the example in the image below. Even though data is being sampled consistently throughout the viewable range, it appears as though fewer points are available in the circled area.

This may only occur when more than 5,000 points are visible on the graph at once and sample rates exceed 50k.



**Workaround:**

Pan or scale the graph by touching it to force a refresh. All data will appear. The measurements were taken and are in the buffer.

If you touch the screen in “Continuous Measurement Triggering” mode, panning in the time dimension will lock your time position. This will freeze your view on older data. If you continue to take measurements, your data will correctly disappear when the buffer wraps and the older data you were looking at is overwritten (assuming your buffer is continuous). If you wish to avoid this, it may be helpful to put the instrument in Manual (“Trigger Key Triggering”) mode and manually trigger each acquisition using the TRIGGER key.

PR54436 UI graph may fail to autoscale under certain circumstances

**Models affected:**

DMM7510 (all variations)

**Symptom:**

When viewing the graph, the graph may not autoscale correctly when the x-axis scale is set to “All”.

**Workaround:**

Pan or scale the graph by touching it to force a refresh. The autoscale algorithm will correct itself.

PR54415 UI graph does not display the dashed lines for the analog trigger levels set over the bus

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure the analog trigger using remote bus commands. Then view the graph from the front panel. The dotted line to indicate the analog trigger level(s) will not appear.

**Workaround:**

There is no workaround over the bus. The only option is to program the level from the UI for it to be visible.

PR54741 UI graph can encounter scaling and panning difficulties when displaying 2 or more traces

**Models affected:**

DMM7510 (all variations)

**Symptom:**

Configure the graph to show 2 or more traces at once. Autoscale may not always work correctly. Panning and zooming the signals may also be difficult at times.

**Workaround:**

For screen gestures, try repeating the operation over the trace you wish to modify. If autoscale is not yielding expected results, try manually setting scale. The "Scale" tab can always be used to precisely set a scale to pan or zoom into a trace.

PR54718 UI Reading Table does not always allow scrolling to access all digitized readings

**Models affected:**

DMM7510 (all variations)

**Symptom:**

The UI Reading Table (Menu > Reading Table) may not allow you to scroll down using the touch screen or the on screen arrows even though there is additional data. This problem is particularly pronounced after using the "Jump to" option to navigate the table.

**Workaround:**

Use the "Refresh" button and then try to navigate again. This often works if the "Jump to" option has never been invoked. If this still does not work, use the "Jump to" option. Jumping should allow for full access to the entire data set.

PR48636 DMM7510 writes to a USB Flash drive file that is read only

**Models affected:**

DMM7510 (all variations), 2450, 2460

**Symptom:**

The DMM7510 will write over read-only files on flash drives. For example, if the DMM7510 attempts to write to file aaa.txt that is marked read-only, the DMM7510 will rewrite file aaa.txt without warning. This problem does NOT suggest the DMM7510 randomly overwrites arbitrary files on a flash drive.

**Workaround:**

There is no known workaround for this issue at this time.